

**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
BEFORE THE ADMINISTRATOR**

IN THE MATTER OF:

Docket No. RCRA-10-99-0106

U.S. Department of Energy,
Richland Operations Office
Richland, Washington

Respondent,

Proceeding pursuant to Sections
3008(a),(g) and 6001 of the Resource
Conservation and Recovery
Act, 42 U.S.C. §§6928, 6921

1 42 U.S.C. §§ 6928, 6961, and the Consolidated Rules of Practice Governing Administrative
2 Assessment of Civil Penalties and the Revocation or Suspension of Permits (“CROP”), 40 C.F.R.
3 Part 22.

4 2. Paragraphs 23 through 59 of the Complaint allege that Respondent violated regulatory
5 requirements of the Washington Administrative Code (“WAC”), specifically that Respondent:

6 (a) stored dangerous waste without a permit in violation of WAC 173-303-800
7 (Count I of the Complaint);

8 (b) failed to make a dangerous waste designation in violation of WAC 173-303-
9 070 (Count II of the Complaint); and

10 (c) failed to immediately amend a contingency plan in violation of WAC 173-
11 303-350(5) (Count III of the Complaint).

12 Count III of the Complaint (paragraph c. immediately above) was dismissed with
13 prejudice at pre-hearing conference in this matter on motion of Complainant, and is not,
14 therefore, the subject of this Consent Agreement and Final Order.

15 3. Respondent filed an Answer and requested a hearing pursuant to Section 3008(b) of
16 RCRA, 42 U.S.C. § 6928(b), and Section 22.15 of the CROP, 40 C.F.R. § 22.15.

17 4. This Consent Agreement and Final Order shall apply to and be binding upon
18 Respondent, its officers, directors, servants, employees, agents, successors and assigns,
19 including, but not limited to, subsequent purchasers.

20 5. Respondent stipulates that EPA has jurisdiction over the subject matter alleged in the
21 Complaint and that the Complaint states a claim upon which relief may be granted against
22 Respondent. Respondent waives any defenses it might have as to jurisdiction and venue, and,
23 without admitting or denying the factual allegations or alleged violations contained in the
24 Complaint, consents to the terms of this Consent Agreement and Final Order.

25 6. Respondent hereby waives its right to a judicial or administrative hearing on any issue
26 of law or fact set forth in the Complaint.

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1 **II. TERMS OF SETTLEMENT**

2 7. Respondent consents to the issuance of the Consent Agreement and Final Order
3 hereinafter recited and consents for the purposes of settlement to the payment of the civil penalty,
4 the performance of two (2) Supplemental Environmental Projects ("SEPs"), and the performance
5 of the compliance activities described herein.

6 **CIVIL PENALTY**

7 8. Pursuant to § 3008 of RCRA, 42 U.S.C. § 6928, the nature of the alleged violations,
8 Respondent's agreement to perform two SEPs and other relevant factors, EPA has determined
9 that an appropriate civil penalty to settle this action is in the amount of twenty five thousand
10 dollars (\$25,000).

11 9. Within thirty (30) calendar days of receiving a copy of this Consent Agreement and
12 Final Order signed by the EPA Regional Administrator, Region 10, ("Regional Administrator")
13 Respondent shall submit payment either by electronic funds transfer or a cashier's or certified
14 check, to the order of the "Treasurer, United States of America," in the amount of twenty five
15 thousand dollars (\$25,000) to:

16 U.S. EPA, Region 10
17 P.O. Box 360903M
Pittsburgh, Pennsylvania 15251

18 Respondent shall provide a copy of the written notification of funds transfer or check to:

19 Mary A. Shilcutt
20 Regional Hearing Clerk (ORC-158)
21 U.S. Environmental Protection Agency, Region 10
1200 Sixth Avenue
Seattle, WA 98101

22 and

23 Lisa A. Castañon
24 Assistant Regional Counsel (ORC-158)
25 U.S. Environmental Protection Agency, Region 10
1200 Sixth Avenue
Seattle, WA 98101

26 **SUPPLEMENTAL ENVIRONMENTAL PROJECTS**

27 10. Respondent shall undertake and complete the following SEPs, which the Parties

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1 agree are intended to secure significant environmental or public health protection and
2 improvements. Within thirty (30) calendar days of receiving a copy of this Consent Agreement
3 and Final Order signed by the Regional Administrator, Respondent shall initiate the following
4 SEPs:

5 (a) SEP No. 1: Rather than disposing of twenty-five hundred (2,500) lead bricks in a
6 landfill located at Hanford, Respondent shall perform a radiological survey on such bricks to
7 determine whether they are eligible for placement in Respondent's excess inventory program.
8 Only those bricks that have been surveyed and indicate no greater than background levels of
9 radiation will be placed in the excess inventory program. Respondent will release the
10 uncontaminated bricks to a community organization with the expectation that such organization
11 will sell the bricks for reuse and will use the funds derived from the sale for community
12 economic development activities. Subject to Paragraph 13, this SEP will be deemed completed
13 when all 2500 bricks are surveyed, and those found to be uncontaminated are placed in the
14 excess inventory program (i.e., are available for release to a community organization) and those
15 determined to be contaminated are scheduled for appropriate disposal.

16 (b) SEP No. 2: Respondent shall perform a pollution prevention/reduction project to
17 develop and implement new analytical procedures that would eliminate sodium interference for
18 certain laboratory methods used at Hanford. The new methods will utilize smaller volumes of
19 analytical chemical reagents, and the elimination of sodium will reduce the need for multiple
20 dilutions for a single analysis, thereby reducing the generation of mixed waste. Subject to
21 Paragraph 13, this SEP shall be deemed completed upon development of the sodium reduction
22 procedure and, subject to successful completion of Hanford's quality assurance validation
23 process, implementation of the procedure in one or more laboratories for a period of not less than
24 one (1) year. The parties agree that use of the procedure beyond one year shall not be mandatory.

25 Respondent shall complete the SEPs as follows: SEP No. 1 shall be completed within six
26 (6) months from the date of receiving a copy of the Consent Agreement and Final Order signed
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1 by the Regional Administrator; SEP No. 2 shall be completed within twenty four (24) months,
2 including the one-year implementation period, from the date of receiving a copy of this Consent
3 Agreement and Final Order signed by the Regional Administrator. The SEPs are more
4 specifically described in the scope of work (hereinafter, the "Scope of Work"), attached hereto as
5 Exhibit A and incorporated herein by reference.

6 11. In accordance with the specifications set forth in the Scope of Work, the total
7 expenditure shall be not less than thirty-nine thousand nine hundred and eighty three dollars
8 (\$39,983) for SEP No. 1 and fifty thousand dollars (\$50,000) for SEP No. 2 . Respondent shall
9 provide Complainant with documentation of the expenditures made in connection with the SEPs
10 as provided for in paragraph 14.

11 12. Respondent hereby certifies that, as of the date of this Consent Agreement and Final
12 Order, Respondent is not required to perform or develop the SEPs by any federal, state or local
13 law or regulation; nor is Respondent required to perform or develop the SEPs by agreement,
14 grant or as injunctive relief in this or any other case. Respondent further certifies that
15 Respondent has not received, and is not presently negotiating to receive, credit in any other
16 enforcement action for the SEPs described herein.

17 13. Whether Respondent has complied with the terms of this Consent Agreement and
18 Final Order as herein required shall be the sole determination of EPA.

19 14. (a) Respondent shall submit to EPA a separate SEP Completion Report for each SEP
20 identified in paragraph 10 within thirty (30) calendar days of the SEP completion date set forth in
21 paragraph 10, or within thirty (30) calendar days of actually completing the SEP, if earlier. The
22 SEP Completion Report shall contain the following information:

- 23 (i) A detailed description of the SEP as implemented;
24 (ii) A description of any operating problems encountered and the solutions
25 thereto;
26 (iii) Itemized costs incurred as a result of the performance of the SEP. In order to
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document costs incurred, Respondent has agreed to establish a separate auditable cost account under the Hanford Site accounting system to track expenditures made in connection with performance of the SEPs specified herein, and will provide Complainant a report of the transactions recorded by the cost account with each SEP completion report. Respondent shall provide EPA with any requested underlying cost documentation for any SEP expenditure within fourteen (14) calendar days of request of such documentation.

(iv) Certification that the SEP has been fully implemented pursuant to the provisions of this Consent Agreement and Final Order; and

(v) A description of the environmental and public health benefits resulting from implementation of the SEP (with a quantification of the benefits and pollutant reductions, if feasible).

(b) Respondent agrees that failure to submit a SEP Completion Report shall be deemed a violation of this Consent Agreement and Final Order and Respondent shall become liable for stipulated penalties pursuant to paragraph 18 below.

15. Respondent agrees that EPA may inspect the facility at any reasonable time in order to confirm that a SEP is being undertaken in conformity with the representations made herein.

16. Respondent shall continuously use the laboratory procedures developed under SEP No. 2 for not less than one (1) year.

17. Respondent shall maintain legible copies of documentation of the underlying research and data for any and all documents or reports submitted to EPA pursuant to this Consent Agreement and Final Order, and Respondent shall provide the documentation of any such underlying research and data to EPA within fourteen (14) calendar days of a request for such information. In all documents or reports, including, without limitation, the SEP Completion Reports, submitted to EPA pursuant to this Consent Agreement and Final Order, Respondent shall, by its officers, sign and certify under penalty of law that the information contained in such document or report is true, accurate, and not misleading by signing the following statement:

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1 I certify under penalty of law that I have examined and am familiar with the
2 information submitted in this document and all attachments and that, based on my
3 inquiry of those individuals immediately responsible for obtaining the
4 information, I believe that the information is true, accurate, and complete. I am
5 aware that there are significant penalties for submitting false information,
6 including the possibility of fines and imprisonment.

7 18.(a) Following receipt of a SEP Completion Report described in paragraph 14 above,
8 EPA will do one of the following:

9 (i) accept the Report;

10 (ii) reject the Report, notify the Respondent, in writing, of deficiencies in the
11 Report and grant Respondent an additional thirty (30) calendar days in which to correct any
12 deficiencies; or

13 (iii) reject the Report and seek stipulated penalties in accordance with paragraph
14 19 herein.

15 (b) If EPA elects to exercise option (ii) above, EPA shall permit Respondent the
16 opportunity to object in writing to the notification of deficiency or disapproval given pursuant to
17 this paragraph within ten (10) calendar days of receipt of such notification. EPA and Respondent
18 shall have an additional thirty (30) calendar days from the receipt by the EPA of the notification
19 of objection to reach agreement. If agreement cannot be reached on any such issue within this
20 thirty (30) day period, EPA shall provide a written statement of its decision to Respondent, which
21 decision shall be final and binding upon Respondent. Respondent agrees to comply with any
22 requirements imposed by EPA as a result of any such deficiency or failure to comply with the
23 terms of this Consent Agreement and Final Order. In the event the SEPs are not completed as
24 contemplated herein, as determined by EPA, stipulated penalties shall be due and payable by
25 Respondent to EPA in accordance with paragraph 19 herein.

26 19.(a) In the event that Respondent fails to comply with any of the terms or provisions of
27 this Agreement relating to the performance of the SEPs described in paragraph 10 above and/or
28 to the extent that the actual expenditures for the SEPs do not equal or exceed the cost of the SEPs

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described in paragraph 11 above, Respondent shall be liable for stipulated penalties according to the provisions set forth below:

(i) Except as provided in subparagraph (ii) immediately below, if a SEP has not been completed satisfactorily pursuant to this Consent Agreement and Final Order, Respondent shall pay a stipulated penalty to the United States in the amount of thirty-nine thousand nine hundred and eighty three dollars (\$39,983) for SEP No. 1 and fifty thousand dollars (\$50,000) for SEP No. 2.

(ii) If a SEP is not completed satisfactorily, but Respondent: a) made good faith and timely efforts to complete the project; and b) certifies, with supporting documentation, that at least ninety percent (90%) of the amount of money which was required to be spent on the particular SEP was expended, Respondent shall not be liable for any stipulated penalty for that SEP.

(iii) If a SEP is satisfactorily completed, but Respondent spent less than ninety percent (90%) of the amount of money required to be spent for the project, Respondent shall pay a stipulated penalty to the United States in the amount of six thousand five hundred dollars (\$6,500) for SEP No. 1 and eight thousand five hundred dollars (\$8,500) for SEP No. 2.

(iv) If a SEP is satisfactorily completed, and Respondent spent at least ninety percent (90%) of the amount of money required to be spent for the project, Respondent shall not be liable for any stipulated penalty for that SEP.

(v) For failure to submit a SEP Completion Report required by paragraph 14(a) above, Respondent shall pay a stipulated penalty in the amount of five hundred dollars (\$500) for each calendar day after the due date specified in the Scope of Work until the report is submitted.

(b) The determinations of whether a SEP has been satisfactorily completed and whether Respondent has made a good faith, timely effort to implement a SEP shall be in the sole discretion of EPA.

(c) Stipulated penalties for subparagraph (v) above shall begin to accrue on the calendar

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1 day after performance is due, and shall continue to accrue through the final day of the completion
2 of the activity.

3 (d) Respondent shall pay stipulated penalties within fifteen (15) calendar days of receipt
4 of written demand by EPA for such penalties. Method of payment shall be in accordance with
5 the provisions of paragraph 9 above.

6 (e) Nothing in this agreement shall be construed as prohibiting, altering or in any way
7 limiting the ability of EPA to seek any other remedies or sanctions available by virtue of
8 Respondent's violation of this agreement or of the statutes and regulations upon which this
9 agreement is based, or for Respondent's violation of any applicable provision of law.

10 20. Any public statement, oral or written, in print, film, or other media, made by
11 Respondent making reference to the SEPs shall include the following language, "This project
12 was undertaken in connection with the settlement of an enforcement action taken by the U.S.
13 Environmental Protection Agency for violations of dangerous waste regulations under the
14 Washington Administrative Code."

15 21. This Consent Agreement and Final Order shall not relieve Respondent of its
16 obligation to comply with all applicable provisions of federal, state or local law, nor shall it be
17 construed to be a ruling on, or determination of, any issue related to any federal, state or local
18 permit, nor shall it be construed to constitute EPA approval of any equipment or technology
19 installed by Respondent in connection with the SEP under the terms of this Agreement.

20 22.(a) If any event occurs which causes or may cause delays in the completion of the
21 SEPs as required under this Agreement, Respondent shall notify Complainant in writing within
22 ten (10) calendar days of the delay or Respondent's knowledge of the anticipated delay,
23 whichever is earlier. The notice shall describe in detail the anticipated length of the delay, the
24 precise cause or causes of the delay, the measures taken and to be taken by Respondent to
25 prevent or minimize the delay, and the timetable by which those measures will be implemented.
26 The Respondent shall adopt all reasonable measures to avoid or minimize any such delay.

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1 Failure by Respondent to comply with the notice requirements of this paragraph shall render this
2 paragraph void and of no effect as to the particular incident involved and constitute a waiver of
3 the Respondent's right to request an extension of its obligation under this Agreement based on
4 such incident.

5 (b) If the Parties agree that the delay or anticipated delay in compliance with this
6 Agreement has been or will be caused by circumstances entirely beyond the control of
7 Respondent, the time for performance hereunder may be extended for a period no longer than the
8 delay resulting from such circumstances. In such event, the Parties shall stipulate to such
9 extension of time.

10 (c) In the event that EPA does not agree that a delay in achieving compliance with the
11 requirements of this Consent Agreement and Final Order has been or will be caused by
12 circumstances beyond the control of the Respondent, EPA will notify Respondent in writing of
13 its decision and any delays in the completion of the SEP shall not be excused.

14 (d) The burden of proving that any delay is caused by circumstances entirely beyond the
15 control of the Respondent shall rest with the Respondent. Increased costs or expenses associated
16 with the implementation of actions called for by this Agreement shall not, in any event, be a basis
17 for changes in this Agreement or extensions of time under section (b) of this paragraph. Delay in
18 achievement of one interim step shall not necessarily justify or excuse delay in achievement of
19 subsequent steps.

20 COMPLIANCE ACTIVITIES

21 23. Respondent shall coordinate with the Washington State Department of Ecology
22 ("Ecology") to identify applicable closure and post-closure requirements of WAC 173-303-610
23 for those portions of the area referred to as the 200 East Pipe Yard where the seventeen drums
24 that are the subject of Count I were ever stored ("storage area"). Such coordination shall be
25 completed within thirty (30) calendar days of Respondent's receipt of a copy of this Consent
26 Agreement and Final Order signed by the Regional Administrator. During such coordination,
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Respondent may provide Ecology with documentation, if any, showing that no release of hazardous waste from the seventeen drums has occurred in the storage area, including a description of the activities undertaken to support any such showing. The Parties agree that any releases other than those associated with the storage area that are discovered by Respondent as part of this process will be included in the Waste Information Data System ("WIDS"). Within ninety (90) days of concluding the consultation with Ecology recited above, i.e., within one hundred twenty days (120) calendar days of receiving a copy of this Consent Agreement and Final Order signed by the Regional Administrator, Respondent shall submit a closure plan for the storage area to Ecology in accordance with the applicable requirements of WAC 173-303-610. After the closure plan is approved by Ecology, Respondent shall implement the plan in accordance with the schedule set forth in the closure plan.

24. Respondent shall properly determine in compliance with WAC 173-303-070 whether scintillation cocktails, when they become solid waste, are dangerous waste.

25. Respondent shall provide refresher training on how to properly conduct a dangerous waste designation for scintillation cocktail waste under WAC 173-303-070 to those persons responsible for performing waste designations at the Hanford WSCF Laboratory. Within sixty (60) calendar days of receipt of this Consent Agreement and Final Order signed by the EPA Regional Administrator, Respondent shall provide a minimum of four (4) hours of refresher training to the individuals identified above. The required training may consist of a combination of classroom instruction and on-the-job training. Upon the completion of training, the individuals trained shall undertake a written examination covering the subject matter.

26. All activities to be performed pursuant to paragraphs 23 and 25 shall be under the direction and supervision of qualified personnel. Respondent shall provide a copy of this Consent Agreement and Final Order and the closure plan to all contractors, subcontractors, laboratories and consultants retained to conduct or monitor any portion of the activities performed pursuant to paragraphs 23 and 25.

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27. Attached as Exhibit B is a Certificate of Completion which must be executed by Respondent and submitted within fourteen (14) calendar days after full compliance with the provisions in paragraphs 23 and 25 to the EPA Regional Hearing Clerk identified in paragraph 9 and a copy to the following address:

Manager, RCRA Compliance Unit
U.S. Environmental Protection Agency, Region 10
Mail Code WCM-126
1200 Sixth Avenue
Seattle, Washington 98101

28. This Consent Agreement and Final Order constitutes a settlement by EPA of all claims for civil penalties pursuant to Sections 3008(a) and 6001 of RCRA, 42 U.S.C. §§ 6928, 6961 for the violations alleged in the Complaint. Nothing in this Consent Agreement and Final Order is intended to nor shall be construed to operate in any way to resolve any criminal liability of the Respondent. Compliance with this Consent Agreement and Final Order shall not be a defense to any actions subsequently commenced pursuant to Federal laws and regulations administered by EPA, and it is the responsibility of Respondent to comply with such laws and regulations.

29. Each undersigned representative of the Parties to this Consent Agreement and Final Order certifies that he or she is fully authorized by the party represented to enter into the terms and conditions of this Consent Agreement and Final Order and to execute and legally bind that party to it.

30. Each party shall bear its own costs and attorneys fees in connection with the action resolved by this Consent Agreement and Final Order.

For Complainant:

For Respondent:

Richard Albright, Director
Office of Waste and
Chemicals Management

Keith A. Klein, Manager
Richland Operation Office
U.S. Department of Energy

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1 U.S. Environmental Protection
2 Agency, Region 10

3 Date: _____ Date: _____

III. FINAL ORDER

4 The foregoing Consent Agreement is hereby approved and incorporated by reference into
5 this Order. The Respondent is hereby ordered to comply with the terms of the above Consent
6 Agreement, effective immediately.

7
8 Date: _____

Charles E. Findley
Acting Regional Administrator
U.S. Environmental Protection Agency, Region 10

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APPENDIX A

**Supplemental Environmental Projects (SEPs)
Scope of Work for SEPs Nos. 1 and 2**

**SEP No. 1: Radiological Survey and Release of 100-H Reactor Lead Bricks
For Reuse**

Department of Energy (DOE) previously removed twenty five hundred lead bricks as part of the remediation of a waste site (100-H Rod Cave) on the Hanford Facility. These bricks are not required to be placed into DOE's excess inventory program. DOE determined that in order to verify the absence of radiological contamination in conformance with DOE Order 5400.5 (Radiation Protection of the Public and the Environment, February 8, 1990), and then place the bricks into the excess inventory program where they would be released to the public, DOE would require a 100% radiological survey of the lead bricks. DOE's requirement to perform a 100% radiological survey of the lead bricks prior to placement in the excess inventory program is consistent with DOE's management of other potentially radiologically contaminated material at the Hanford Facility. If the lead bricks are not 100% surveyed, DOE will treat (encapsulate) them for disposal in the Environmental Restoration Disposal Facility (ERDF) located on the Hanford Site.

As part of this SEP, DOE will perform the 100% radiological survey of all 2500 bricks rather than disposing of them in the Hanford landfill. DOE will survey all six sides of each lead brick for beta-gamma and alpha emitters and release them in accordance with the requirements and references set forth in DOE Order 5400.5, BHI-RC-04 Radiological Control Work Instructions, Material Release (July 31, 2000), and all applicable U.S. Department of Energy Secretarial memoranda addressing the release of such materials. Only those bricks that exhibit

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1 no detectable radiological contamination above background radiation levels will be placed in the
2 excess inventory program. "No detectable radiological contamination" does not mean zero
3 contamination. The level that can be detected depends upon the background radiation level
4 against which the measurement is compared. The BHI-RC-04 Instruction places limits on
5 background radiation levels where surveys are performed such that "no detectable
6 contamination" means less than the contamination limits identified in the BHI-RC-04 Instruction,
7 i.e., for alpha: 20 dpm/100 sq. cm. for removable contamination and 100 dpm/100 sq. cm. for
8 total contamination; for beta: 1000 dpm/100 sq. cm for removable contamination and 5000
9 dpm/100 sq. cm. for total contamination. The survey will be performed using appropriate
10 counting instruments in compliance with BHI-01054, Rev.2, Technical Basis Describe the Use of
11 the E600 and SHP-380 Detectors (June 1997). DOE will schedule appropriate disposal for those
12 bricks that do not pass the radiological survey.

13 The survey process will be validated by taking verification samples from selected lead
14 bricks and sending them to an independent laboratory for analysis. The number of verification
15 samples needed to confirm the survey process will be determined by evaluating the results of the
16 survey data and applying a sampling design method developed in accordance with USEPA-SW-
17 846. Verification samples will consist of smear samples from lead brick surfaces. Those samples
18 will then be analyzed by an independent laboratory for gross alpha and gross beta activity using
19 gas proportional or liquid scintillation counting. The laboratory results will be used to verify
20 radiological field survey methods.

21 The excess inventory program (operated by DynCorp Tri Cities) serves Hanford
22 contractors by dispositioning surplus government property in accordance with federal property
23 management requirements. The Tri-City Asset Reinvestment Company (TARC), a Community
24 Reuse Organization (CRO) under part of the 3161 Worker Transition Program, will take delivery
25 (free of charge) of the lead bricks that have passed the survey (i.e., those that exhibit no
26 detectable radiological contamination above background radiation levels as described above) and
27

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have been placed in the excess inventory program. It is DOE's expectation that the TARC will sell the lead bricks to a private company for use as radiation shielding. The proceeds will be used to foster economic development in the Tri Cities and surrounding areas.

Project Type	Waste Volume Reduction Recycle
Primary Avoided Waste	Mixed Low Level Waste
Completion Time	6 months
Capital \$	\$0
Expense \$	\$39,983
Total Project Cost	\$39,983
Projected Waste Reduction	28.34 metric tons of lead bricks, and 4.6 cubic meters of volume for macroencapsulation consisting of containers filled with grout material.
Regulatory Drivers	None
Funding Status	Proposed but unfunded

Waste Type/Pollutant Avoided/Reduced

The waste type: Environmentally hazardous substance, toxic characteristic waste, D008, elemental lead (2"x4"x8" bricks), land disposal restricted hazardous debris.

Implementation Risk

This project utilizes commercially available, "off-the-shelf" technology. No developmental work will be required. By performing this survey for release, risks are reduced compared to disposal of all of the bricks at the ERDF.

Project Contact

DOE - Douglas (Chris) Smith (509) 372-1544, FAX (509) 372-1926, email
Douglas_C_Smith_Smith@rl.gov

Contractor - Bechtel Hanford Inc., Doug DuVon, Waste Minimization Coordinator (509)
372-9182, FAX (509) 372-9718, email dkduvon@bhi-erc.com

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2 **SEP No. 2: Development of Laboratory Procedures to Eliminate**
3 **Sodium Interferences for ICP-AES, ICP/MS and IC Methods**

4
5 DOE will investigate and develop laboratory methods for removal of high concentrations
6 of sodium from Hanford's tank waste samples to accommodate sample analysis with fewer
7 dilutions. DOE currently uses three methods to analyze large numbers of samples on a yearly
8 basis: 1. inductively coupled plasma – atomic emission spectroscopy (ICP-AES); 2. inductively
9 coupled plasma – mass spectrometry (ICP/MS); and 3. ion chromatography (IC), which are
10 plagued by interferences from high concentrations of sodium in tank wastes. The types of
11 samples that are obtained from Hanford tanks contain high concentrations of sodium that often
12 interfere with analysis of other metals and anions. Multiple sample analyses are often required
13 for single determinations, and due to the extent of dilution required with current methods, some
14 analyses are performed many times in order to get consistent and reliable results.

15 Implementation of sodium removal methods also has utility in analysis of tank samples for a
16 number of constituents of concern using low waste volume methods such as ammonia analysis by
17 IC and ICP-MS. These methods in particular suffer from the effects from sodium salts clogging
18 sample delivery systems.

19 In the work proposed, results will be compared between samples analyzed before and
20 after sodium removal. In situations where elemental loss is observed, i.e., loss of metals or
21 anions of analytical interest, the method will be modified where possible to correct for these
22 losses using tracers and yield analyses. The method will be used for those samples from which
23 losses are not expected to occur or corrections can be made for element loss. The procedure will
24 be implemented for no less than one year, however, its use beyond one year is not mandatory.

25 **Estimate of Waste Reduction**

26 Assuming a workload of 10,000 samples (including quality control standards and blanks)
27 for ICP-AES, ICP-MS and 2,000 IC (ammonia analysis) in a single year an estimate of the waste

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reductions for this project is:

Liquid Mixed Waste Reduction

Current practice: 10,000 samples x 50 mL/sample = 600 liters sample analysis/required dilutions. 2,000 samples x 20 mL/sample = 40 liters sample analysis on IC

Proposed practice: 12,000 samples x 5 mL/sample = 60 liters analysis (no dilutions and reruns). Mixed Waste Reduction : 580 liters

Project Type	Pollution Prevention/Reduction
Primary Avoided Waste	RCRA Mixed Waste
Develop Procedure	12 months
Implementation Period	12 months
Requested Cap \$	\$ 0
Requested Expense \$	\$ 50,000
Total Project Cost	\$ 50,000
Projected Annual Waste Reduction	Approximately 580 liters of liquid laboratory hazardous waste
Regulatory Drivers	None
Funding Status	New unfunded proposal

Waste Type/Pollutant Avoided/Reduced

RCRA mixed waste resulting from performance of analytical laboratory procedures.

Project Description and Deliverables

Literature Search

A literature search of current chemical analysis literature will be performed to ensure the use of the most appropriate method for Hanford tank materials

Time required: 1 month of 0.5 chemist effort

Deliverable: approach to method will be defined specifically for Hanford needs.

CONSENT AGREEMENT AND FINAL ORDER

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1 **Develop Statement of Work**

2 A description of the specific requirements for the tests and implementation of the final
3 procedure to meet the needs of engineers at the Hanford tank farms and the laboratory
4 technical staff will be written and approved by laboratory management at the 222-S
5 facility.

6 Time required: 1 week - 1 chemist effort

7 Deliverable: signed statement of work approved by 222-S laboratory

8 **Develop Draft Procedure and Procure Supplies**

9 Procure Supplies and Set up Non-Radioactive Simulant Tests/Optimize Method:

10 Method set up and original optimization will take place in a non-radioactive environment
11 to reduce personnel exposure while details of the method are worked out. Prior to
12 initiation of laboratory work on the method, an initial draft of a test procedure will be
13 written and a safety assessment will be performed on the test procedure. Simulant tank
14 samples will be analyzed by the draft method. The method will then be optimized for use
15 on radioactive tank materials. Optimization will concentrate on applicability to at least
16 50 metals and 10 ions required for tank sample analyses at the radiological laboratory.

17 Time required: 5 months of 0.25 chemist effort

18 Deliverable: draft test procedure with safety approval

19 Set up Method in Laboratory Hot Cells or Hood:

20 Prior to set up in the radiological laboratory, an area for deployment will be selected
21 based on the number of samples and radiological character expected from samples due to
22 arrive at the laboratory in upcoming years. A radiological screening assessment will also
23 be performed in preparation for method initiation. The method will be set up in the zone
24 selected and a set of laboratory standard solutions will be run in a preliminary testing to
25 assure the system is ready for validation.

26 Time required: 2 weeks of 0.5 chemist effort

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28 **CONSENT AGREEMENT AND FINAL ORDER**

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1 Deliverable: equipment deployed in radiological laboratory

2 **Validate and Report Method Validation to Analytical Service Project Laboratory**
3 **Quality Assurance Group**

4 A statistical set of archived tank sample liquids will be run through the separation method
5 and a comparison study will be performed using existing laboratory data. In addition to
6 the samples, a set of solution standards will also be analyzed to assess the effectiveness of
7 sodium removal from the metals and anions of interest (those assessed in cold testing). A
8 report will be generated that will be placed in the final procedure file as part of the
9 validation requirements.

10 Time required: 3 months of 0.25 chemist effort and 0.25 technical staff effort

11 Deliverable: validation report submitted to 222-S laboratory QA

12 **Review, Modify and Approve Final Procedure**

13 The draft will be processed through the formal formatting and approval cycles required
14 for routine use in the laboratory. Part of the review includes evaluation of safety,
15 radiological control, waste management protocols, and impact on data quality. Review
16 comments are addressed and modifications are made to the procedure as recommended by
17 the laboratory safety, environmental compliance and quality assurance officers and
18 management. When the procedure is formally approved by all reviewers, chemical
19 technologists will be trained to run the method.

20 Time required: 1 month - 1 person effort (as distributed between 10 to 12 reviewers)

21 Deliverable: final procedure for use on a routine basis in the laboratory; provide written
22 notification to EPA regarding the finalized procedure and explanation of the scope of
23 implementation.

24 **Implement Final Procedure**

25 Following notification to EPA, DOE will implement the procedure for a period of not
26 less than one year.

27 **Project Contact**

28 **CONSENT AGREEMENT AND FINAL ORDER**

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1 DOE - Beverly A. Crawford, PhD, Technology, Operations and Process Sciences, (509)
2 373-1972.

3 Contractor - FDH Inc., Peter Segall, Waste Minimization Coordinator (509) 372-0469.
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IN THE MATTER OF:)	
)	Docket No. RCRA-10-99-0106
U.S. Department of Energy,)	
Richland Operations Office)	
Richland, Washington)	
)	
Respondent,)	CERTIFICATE OF COMPLETION
)	
Proceeding pursuant to Sections)	
3008(a),(g) and 6001 of the Resource)	
Conservation and Recovery)	
Act, 42 U.S.C. §§6928, 6921)	
)	

I, _____, certify, in accordance with 28 U.S.C. 1746 and under penalty of perjury, that the following statements are true, accurate, and correct:

- a. I am a [principal] of the above-captioned Respondent.
- b. Respondent has fully completed the compliance activities described in paragraphs 23 and 25 of the Consent Agreement and Final Order.

EXECUTED this _____ day of _____, 2000.

[Name]
[Title]

In the Matter of U.S. Dept. of Energy
Richland Operations Office
RCRA-10-99-0101